

Historic Masonry and Mortar

Advisory to Homeowners and Contractors

Newburyport has many structures built of old brick and traditional lime mortar, which was in general use here until the early 20th century. Old bricks are not only beautiful; they are softer and more porous than modern bricks, and they provide internal heating efficiency by absorbing and reradiating heat, a key feature of old fireplaces. **Old brick is different than new**, and the proper care of historic brick is critical to its lifespan and performance. *The primary concern is that the mortar must be softer and more permeable as the brick, and as soft and permeable as the existing mortar.*

The Newburyport Historical Commission and the Newburyport Preservation Trust, in consultation with experienced local preservationists and consultants, including restoration mason Richard Irons, provide this information to help homeowners and contractors care for old brick correctly.

Please also consult the following Preservation Briefs from the U.S. Department of the Interior, National Park Service, Heritage Preservation Services (<https://www.nps.gov/tps/how-to-preserve/briefs.htm>):

- 1: **Cleaning and Water-Repellent Treatments for Historic Masonry Buildings**
- 2: **Repointing Mortar Joints in Historic Masonry Buildings** (We strongly urge your masonry contractor to read this brief in its entirety!)
- **A Glossary of Historic Masonry Deterioration Problems and Preservation Treatments** (Department of the Interior National Park Service Preservation Assistance Division; 1984)

Lime Mortar: *Old brick must be laid or repointed with traditional lime mortar.*

Whether on the interior or exterior, it is vitally important that traditional lime mortar be used for repointing. Mortar joints must be softer than the material they support. They are the ‘sacrificial lamb’ through which moisture is allowed to escape. When moisture is trapped by hard mortar, such as modern mortar mixes made with Portland cement, it has no place to go but into the brick. The brick then starts to spall, peeling away in layers and small chunks.

Masonry joints have been made with traditional mortar - lime and sand – for thousands of years. Buildings in Europe that are hundreds of years old still retain this mortar mix and are as solid as when they were built. In the United States, impervious mortar based on Portland cement came into widespread use around 1930. As a result, generations of brick masons have little or no experience with traditional lime mortar. **Modern mortar mixes, such as are commonly sold today, are very hard and should never be used on old brick, neither interior nor exterior. The use of modern mortar can cause permanent damage to historic buildings.**

Cleaning Mortar Joints.

Extreme care must be used when removing old mortar joints. The best solution for a small area is the use of hand tools, taking care not to injure or chip the brick. On very important historic buildings the Federal Government is involved in, only hand tools are allowed, to avoid damaging the brick. In large areas which need to be repointed, power tools such as grinders may be used. But the grinding wheel must be substantially smaller than the joint itself, and used only by an experienced operator.

Major damage is often caused to historic brick by inexperienced grinding, cutting the surface of the brick. This causes the brick to become even more porous, promoting destructive spalling. Once the brick itself is compromised, repairs are much more expensive.

Cleaning Brick.

Never sandblast old brick! Sandblasting causes the face of brick to become more porous, allowing water to enter and damage the brick – and the building. There are times when brick must be cleaned, but extreme caution must be used. See Preservation Brief #1 “Assessing Cleaning and Water-Repellent Treatments of Historic Masonry Buildings” cited above.

Brick Replacement.

If old brick must be replaced, old, matching bricks should be used, never new brick, if at all possible.

The National Park Service has advised use of the following mortar mixes for repointing old brick and stone in Newburyport and vicinity:

“NHL” refers to Natural Hydraulic Lime, the number refers to its hardness.

City Hall, Newburyport (c. 1851)

1 part NHL 3.5 and 2 to 2.25 parts sand for repointing brick.

1 part NHL 5.0 and 2 to 2.25 parts sand for setting reused brick and new restoration brick.

Note: To avoid the bright white color of new mortar joints the mortar was muted with color. The best way to dull brightness is to use more yellow or brown sand. Fine brown sand often has good clay content for a more muted, off-white appearance. See actual specifications for use.

Custom House, Newburyport (c. 1835)

8 parts masonry sand (ASTM C144 where possible and appropriate) (Georgetown sand was used)

3 parts lime – Minuteman Type S Hydrated – Old Castle Stone Products, Lee, MA

1 part white Lehigh brand – White Portland Cement (ASTM C150)

Note: In this project mortar was not colored and will remain bright white until it weathers

Derby House, Salem (c. 1762)

1 part NHL 5.0 and 2.5 parts sand for repointing brick.

National Park Service architects prefer NHL 5.0 for exterior work in New England. They first used a weaker (lower number) NHL on the Derby House, and it did not hold up well on the exterior brickwork. They changed to NHL 5.0 and it has held up well.

Where to find Lime Mortar

PLEASE NOTE: The following list of vendors and resources, known to the Commission, is provided only as a convenience to homeowners, permit applicants, contractors and others. The list is not exhaustive and **is not a recommendation or endorsement** for the use of any private company providing services for which other vendors may also be available.

Lime Works.us

www.limeworks.us

3145 State Road
Telford, PA 18935

www.stastier.com

St. Astier brand Natural Hydraulic Lime Mortar from France
Local preservationists have used this brand and vendor

Atlas Preservation

www.atlaspreservation.com

122 Spring Street B1
Southington, CT 06489

Otterbein brand Natural Hydraulic Lime Mortar from Germany
Grassello Di Calce brand traditional Lime Putty from Italy
Local preservationists have used this brand and vendor.

Roundtower Lime

www.roundtowerlime.com

Roundtower brand Natural Hydraulic Lime Mortar from Ireland
Local preservationists do not have experience with this vendor or brand.

For homeowners, small amounts of pre-mixed lime mortar can often be purchased in 5-gallon or smaller buckets and even colored to match your existing mortar. Contractors can buy lime mortar by the pallet-load if needed.

For homeowners interested in mortar analysis, see U.S. Heritage Group, Inc.

www.traditional-building.com/brochure/members/limemortar.shtml

Newburyport Historical Commission

Newburyport Preservation Trust

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